

WEST

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Search Results -

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(cyclo-malto-dextrin glucano-transferase)	6

US Patents Full-Text Database
 US Pre-Grant Publication Full-Text Database
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Database: IBM Technical Disclosure Bulletins

Search:

L7

Refine Search

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Search History

DATE: Tuesday, December 31, 2002 [Printable Copy](#) [Create Case](#)Set Name Query

side by side

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result set

DB=USPT,PGPB,JPAB,EPAB,DWPI; PLUR=YES; OP=ADJ

<u>L7</u>	(cyclo-malto-dextrin glucano-transferase)	6	<u>L7</u>
<u>L6</u>	L5 and (47cys, 47asp, 47glu, 47phe, 47gly, 47ile, 47lys, 47asn, 47pro, 47arg, 47ser, 47thr, 47val, 47trp, 47tyr)	0	<u>L6</u>
<u>L5</u>	L1 same bacillus	114	<u>L5</u>
<u>L4</u>	L2 and (47C, 47D, 47E, 47F, 47G, 47I, 47K, 47N, 47P, 47R, 47S, 47T, 47V, 47W, 47Y)	2	<u>L4</u>
<u>L3</u>	L2 same (47C, 47D, 47E, 47F, 47G, 47I, 47K, 47N, 47P, 47R, 47S, 47T, 47V, 47W, 47Y)	0	<u>L3</u>
<u>L2</u>	L1 same (mutant or variant)	27	<u>L2</u>
<u>L1</u>	CGTase	249	<u>L1</u>

END OF SEARCH HISTORY

WEST[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 6 of 6 returned.**☐ 1. Document ID: US 20010033838 A1

L7: Entry 1 of 6

File: PGPB

Oct 25, 2001

PGPUB-DOCUMENT-NUMBER: 20010033838

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20010033838 A1

TITLE: Use of emu oil and its various fractions as a carrier for antifungal, antibacterial, and antiviral medications & preparations

PUBLICATION-DATE: October 25, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Farmer, Sean	La Jolla	CA	US	

US-CL-CURRENT: 424/115; 424/522, 424/780

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Image
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☐ 2. Document ID: US 6461607 B1

L7: Entry 2 of 6

File: USPT

Oct 8, 2002

US-PAT-NO: 6461607

DOCUMENT-IDENTIFIER: US 6461607 B1

TITLE: Probiotic, lactic acid-producing bacteria and uses thereof

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Image
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☐ 3. Document ID: JP 09003089 A

L7: Entry 3 of 6

File: DWPI

Jan 7, 1997

DERWENT-ACC-NO: 1997-115277

DERWENT-WEEK: 199711

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TITLE: New polyphenol glycoside - prepd. using cyclo-malto-dextrin glucano-transferase, useful for isolating polyphenol(s) in vivo

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Clip Img	Image
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☐ 4. Document ID: JP 07023781 A

L7: Entry 4 of 6

File: DWPI

Jan 27, 1995

DERWENT-ACC-NO: 1995-100943

DERWENT-WEEK: 199514

COPYRIGHT 2002 DERWENT INFORMATION LTD

TITLE: Modified cyclo-malto-dextrin glucano-transferase and corresp. gene - useful in the prodn. of gamma-dextrin

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Clip Img	Image
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5. Document ID: JP 05163130 A

L7: Entry 5 of 6

File: DWPI

Jun 29, 1993

DERWENT-ACC-NO: 1993-239908

DERWENT-WEEK: 199330

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TITLE: Novel cosmetic, contg. water-soluble transglycosidated flavonoid - contains trans-glycosidated flavanoid, using catalyst of cyclo-malto-dextrin glucano-transferase, giving antibacterial action

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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6. Document ID: EP 327099 A DE 68909625 E DK 8900508 A EP 327099 B1 JP 01199575 A US 5019507 A US 5102800 A

L7: Entry 6 of 6

File: DWPI

Aug 9, 1989

DERWENT-ACC-NO: 1989-229144

DERWENT-WEEK: 198932

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TITLE: New cyclo-malto-dextrin glucano-transferase - obtd. from novel *Bacillus coagulans* strain, used for producing cyclodextrin cpds. from starch

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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Terms	Documents
(cyclo-malto-dextrin glucano-transferase)	6

Display Format:

-

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WEST[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 27 of 27 returned.**☐ 1. Document ID: US 20020155574 A1

L2: Entry 1 of 27

File: PGPB

Oct 24, 2002

PGPUB-DOCUMENT-NUMBER: 20020155574

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020155574 A1

TITLE: Alpha-amylase mutants with altered properties

PUBLICATION-DATE: October 24, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Thisted, Thomas	Rungsted Kyst		DK	
Kjaerulff, Soren	Vanlose		DK	
Andersen, Carsten	Vaerloese		DK	
Fuglsang, Claus Crone	Niva		DK	

US-CL-CURRENT: [435/202](#); [435/203](#), [435/320.1](#), [435/325](#), [435/69.1](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Draw Desc	Image
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☐ 2. Document ID: US 20020098996 A1

L2: Entry 2 of 27

File: PGPB

Jul 25, 2002

PGPUB-DOCUMENT-NUMBER: 20020098996

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020098996 A1

TITLE: Amylase variants

PUBLICATION-DATE: July 25, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Bisgard-Frantzen, Henrik	Lyngby		DK	
Svendsen, Allan	Birkerød		DK	
Borchert, Torben Vedel	Copenhagen N		DK	

US-CL-CURRENT: [510/392](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Draw Desc	Image
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☐ 3. Document ID: US 20020042120 A1

L2: Entry 3 of 27

File: PGPB

Apr 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020042120
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020042120 A1

TITLE: Novel cyclomalto-dextrin glucanotransferase variants

PUBLICATION-DATE: April 11, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Andersen, Carsten	Vaerloose		DK	
Nielsen, Bjarne Ronfeldt	Virum		DK	
Dijkhuizen, Lubbert	Haren		NL	
Dijkstra, Bauke	Haren		NL	

US-CL-CURRENT: 435/221; 435/252.3, 435/320.1, 536/23.2

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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☐ 4. Document ID: US 20020032142 A1

L2: Entry 4 of 27

File: PGPB

Mar 14, 2002

PGPUB-DOCUMENT-NUMBER: 20020032142
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020032142 A1

TITLE: Detergent compositions comprising a cyclodextrin glucanotransferase enzyme and a detergent ingredient

PUBLICATION-DATE: March 14, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Smets, Johan	Lubbeek		BE	
Pintens, An	Merksem		BE	

US-CL-CURRENT: 510/305; 510/311, 510/312, 510/392

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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☐ 5. Document ID: US 6482622 B1

L2: Entry 5 of 27

File: USPT

Nov 19, 2002

US-PAT-NO: 6482622
DOCUMENT-IDENTIFIER: US 6482622 B1

TITLE: Amylolytic enzyme variants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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☐ 6. Document ID: US 6472192 B1

L2: Entry 6 of 27

File: USPT

Oct 29, 2002

US-PAT-NO: 6472192

DOCUMENT-IDENTIFIER: US 6472192 B1

TITLE: Cyclodextrin glycosyl transferases for producing .gamma.-cyclodextrin

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 7. Document ID: US 6297038 B1

L2: Entry 7 of 27

File: USPT

Oct 2, 2001

US-PAT-NO: 6297038

DOCUMENT-IDENTIFIER: US 6297038 B1

TITLE: Amylase variants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 8. Document ID: US 6271010 B1

L2: Entry 8 of 27

File: USPT

Aug 7, 2001

US-PAT-NO: 6271010

DOCUMENT-IDENTIFIER: US 6271010 B1

TITLE: Cyclomaltodextrin glucanotransferase variants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 9. Document ID: US 6162628 A

L2: Entry 9 of 27

File: USPT

Dec 19, 2000

US-PAT-NO: 6162628

DOCUMENT-IDENTIFIER: US 6162628 A

TITLE: Maltogenic alpha-amylase variants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 10. Document ID: US 6093562 A

L2: Entry 10 of 27

File: USPT

Jul 25, 2000

US-PAT-NO: 6093562

DOCUMENT-IDENTIFIER: US 6093562 A

TITLE: Amylase variants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☒ 11. Document ID: US 6004790 A

L2: Entry 11 of 27

File: USPT

Dec 21, 1999

US-PAT-NO: 6004790

DOCUMENT-IDENTIFIER: US 6004790 A

TITLE: Cyclomaltoodextrin glucanotransferase variants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☐ 12. Document ID: US 5925544 A

L2: Entry 12 of 27

File: USPT

Jul 20, 1999

US-PAT-NO: 5925544

DOCUMENT-IDENTIFIER: US 5925544 A

TITLE: Method of homologous recombination followed by in vivo selection of DNA amplification

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☐ 13. Document ID: US 5919895 A

L2: Entry 13 of 27

File: USPT

Jul 6, 1999

US-PAT-NO: 5919895

DOCUMENT-IDENTIFIER: US 5919895 A

TITLE: Secretion of hirudin derivatives

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☒ 14. Document ID: US 5804426 A

L2: Entry 14 of 27

File: USPT

Sep 8, 1998

US-PAT-NO: 5804426

DOCUMENT-IDENTIFIER: US 5804426 A

TITLE: Recombinant cyclodextran glucanotransferase mutants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☐ 15. Document ID: US 5733753 A

L2: Entry 15 of 27

File: USPT

Mar 31, 1998

US-PAT-NO: 5733753

DOCUMENT-IDENTIFIER: US 5733753 A

TITLE: Amplification of genomic DNA by site specific integration of a selectable marker construct

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☐ 16. Document ID: US 5635378 A

L2: Entry 16 of 27

File: USPT

Jun 3, 1997

US-PAT-NO: 5635378

DOCUMENT-IDENTIFIER: US 5635378 A

TITLE: Variant-type carbohydrate hydrolase, variant gene of the enzyme and method for producing oligosaccharide using the enzyme

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☐ 17. Document ID: US 5631149 A

L2: Entry 17 of 27

File: USPT

May 20, 1997

US-PAT-NO: 5631149

DOCUMENT-IDENTIFIER: US 5631149 A

TITLE: Variant-type carbohydrate hydrolase, variant gene of the enzyme and method for producing oligosaccharide using the enzyme

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☐ 18. Document ID: US 5538882 A

L2: Entry 18 of 27

File: USPT

Jul 23, 1996

US-PAT-NO: 5538882

DOCUMENT-IDENTIFIER: US 5538882 A

TITLE: Variant-type carbohydrate hydrolase, variant gene of the enzyme and method for producing oligosaccharide using the enzyme

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☒ 19. Document ID: US 5474917 A

L2: Entry 19 of 27

File: USPT

Dec 12, 1995

US-PAT-NO: 5474917

DOCUMENT-IDENTIFIER: US 5474917 A

TITLE: Modified cyclodextrin glycosyltransferases for producing .gamma.-cyclodextrins

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KIMC	Draw Desc	Image
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☒ 20. Document ID: US 5409824 A

L2: Entry 20 of 27

File: USPT

Apr 25, 1995

US-PAT-NO: 5409824

DOCUMENT-IDENTIFIER: US 5409824 A

TITLE: .gamma.-CGTase

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 21. Document ID: US 5376537 A

L2: Entry 21 of 27

File: USPT

Dec 27, 1994

US-PAT-NO: 5376537

DOCUMENT-IDENTIFIER: US 5376537 A

TITLE: Process for production of cyclodextrins

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☒ 22. Document ID: JP 10033187 A

L2: Entry 22 of 27

File: JPAB

Feb 10, 1998

PUB-NO: JP410033187A

DOCUMENT-IDENTIFIER: JP 10033187 A

TITLE: CGTASE, PRODUCTION OF MUTANT CGTASE GENE, DNA-SEQUENCE CODING CGTASE,
PRODUCTION OF GAMMA-CGTASE, PRODUCTION OF GAMMA-CD

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 23. Document ID: WO 9943793 A1

L2: Entry 23 of 27

File: EPAB

Sep 2, 1999

PUB-NO: WO009943793A1

DOCUMENT-IDENTIFIER: WO 9943793 A1

TITLE: AMYLOLYTIC ENZYME VARIANTS

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☒ 24. Document ID: WO 9633267 A1

L2: Entry 24 of 27

File: EPAB

Oct 24, 1996

PUB-NO: WO009633267A1

DOCUMENT-IDENTIFIER: WO 9633267 A1

TITLE: CYCLOMALTODEXTRIN GLUCANOTRANSFERASE VARIANTS

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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☐ 25. Document ID: US 6482622 B1 WO 9943793 A1 AU 9925128 A EP 1066374 A1 CN 1292028 A

L2: Entry 25 of 27

File: DWPI

Nov 19, 2002

DERWENT-ACC-NO: 1999-540583

DERWENT-WEEK: 200280

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TITLE: New variants of maltogenic alpha-amylase or cyclodextrin glucanotransferase and their hybrids, used as anti-staling additives for bread and for production of cyclodextrins

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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☒ 26. Document ID: WO 9633267 A1 KR 99007930 A AU 9653968 A EP 822982 A1 JP 11503906 W US 6004790 A

L2: Entry 26 of 27

File: DWPI

Oct 24, 1996

DERWENT-ACC-NO: 1996-485774

DERWENT-WEEK: 200014

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TITLE: New variants of cyclo:malto:dextrin glucanotransferase (CGTase) - have altered substrate binding, useful for prodn. of cyclodextrin(s) or linear oligosaccharide(s), opt. formed in situ in e.g. baked goods

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Clip Img	Image
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☐ 27. Document ID: EP 481903 A CA 2053624 A ES 2052462 T1 FR 2668163 A1 HU 60527 T US 5376537 A

L2: Entry 27 of 27

File: DWPI

Apr 22, 1992

DERWENT-ACC-NO: 1992-134156

DERWENT-WEEK: 199217

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TITLE: Prepn. of beta and gamma cyclodextrin(s) - by reaction of starch with cyclodextrin:glycosyl:transferase obtained from Bacillus ohbensis

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RMK	Draw Desc	Image
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L1 same (mutant or variant)	27

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(FILE 'HOME' ENTERED AT 12:54:56 ON 31 DEC 2002)

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SEA (CYCLOMALTODEXTRIN GLUCANOTRANSFERASE) OR (CGTASE)

36 FILE AGRICOLA
6 FILE ANABSTR
2 FILE AQUASCI
81 FILE BIOBUSINESS
296 FILE BIOSIS
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551 FILE CAPLUS
86 FILE CEABA-VTB
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3 FILE CIN
3 FILE CONFSCI
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268 FILE DGENE
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147 FILE GENBANK
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174 FILE LIFESCI
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247 FILE PASCAL
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9 FILE PROMT
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213 FILE USPATFULL
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L1 QUE (CYCLOMALTODEXTRIN GLUCANOTRANSFERASE) OR (CGTASE)

FILE 'CAPLUS, BIOTECHDS, BIOSIS, SCISEARCH, EMBASE, PASCAL, FSTA, BIOTECHNO, MEDLINE' ENTERED AT 12:59:57 ON 31 DEC 2002

L2 542 S L1 AND (VARIANT OR MUTANT OR RECOMBINANT)
L3 1 S L2 AND (47D OR 47C OR 47E OR 47F OR 47G OR 47I OR 47K OR 47N
L4 432 S L2 AND BACILLUS
L5 12 S L4 AND 47
L6 7 DUP REM L5 (5 DUPLICATES REMOVED)

=> d 16 ibib ab 1-6

L6 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2002 ACS DUPLICATE 1
ACCESSION NUMBER: 2000:446340 CAPLUS
DOCUMENT NUMBER: 133:101286
TITLE: The role of arginine 47 in the cyclization
and coupling reactions of cyclodextrin
glycosyltransferase from *Bacillus circulans*
strain 251 implications for product inhibition and
product specificity
AUTHOR(S): Van der Veen, Bart A.; Uitdehaag, Joost C. M.;
Dijkstra, Bauke W.; Dijkhuizen, Lubbert
CORPORATE SOURCE: Department of Microbiology, Groningen Biomolecular
Sciences and Biotechnology Institute (GBB), University
of Groningen, Haren, 9751 NN, Neth.
SOURCE: European Journal of Biochemistry (2000), 267(12),
3432-3441
CODEN: EJBCAI; ISSN: 0014-2956
PUBLISHER: Blackwell Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Cyclodextrin glycosyltransferase (**CGTase**; EC 2.4.1.19) is used
for the industrial prodn. of cyclodextrins. Its application, however, is
hampered by the limited cyclodextrin product specificity and the strong
inhibitory effect of cyclodextrins on **CGTase** activity. Recent
structural studies have identified Arg-47 in *B. circulans* strain
251 **CGTase** as an active site residue interacting with
cyclodextrins, but not with linear oligosaccharides. Thus, Arg-47
may specifically affect **CGTase** reactions with cyclic substrates
or products. Here, the authors show that mutations in Arg-47
(to Leu or Gln) indeed have a neg. effect on the cyclization and coupling
activities; Arg-47 specifically stabilizes the oligosaccharide
chain in the transition state for these reactions. As a result, the
mutant proteins displayed a shift in product specificity toward
the formation of larger cyclodextrins. As expected, both **mutants**
also showed lower affinities for cyclodextrins in the coupling reaction,
and a reduced competitive (product) inhibition of the disproportionation
reaction by cyclodextrins. Both **mutants** also provided valuable
information about the processes taking place during cyclodextrin prodn.
assays. **Mutant** R47L displayed an increased hydrolyzing
activity, causing accumulation of increasing amts. of short
oligosaccharides in the reaction mixt., which resulted in lower final
amts. of cyclodextrins produced from starch. Interestingly,
mutant R47Q displayed an increased ratio of cyclization/coupling
and a decreased hydrolyzing activity. Due to the decreased coupling
activity, which esp. affects the prodn. of larger cyclodextrins, this
CGTase variant produced the various cyclodextrins in a
stable ratio in time. This feature is very promising for the industrial
application of **CGTases** with improved product specificity.
REFERENCE COUNT: 51 THERE ARE 51 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 2 OF 7 FSTA COPYRIGHT 2002 IFIS
ACCESSION NUMBER: 2000(12):B1957 FSTA
TITLE: The role of arginine 47 in the cyclization
and coupling reactions of cyclodextrin
glycosyltransferase from *Bacillus circulans*
strain 251. Implications for product inhibition and
product specificity.
AUTHOR: Veen, B. A. van der; Uitdehaag, J. C. M.; Dijkstra, B.
W.; Dijkhuizen, L.
CORPORATE SOURCE: Correspondence (Reprint) address, L. Dijkhuizen, Dep.
of Microbiol., Groningen Biomolecular Sci. & Biotech.

Inst. (GBB), Univ. of Groningen, 9751 NN Haren,
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3632154. E-mail L.Dijkhuizen(a)biol.rug.nl
SOURCE: European Journal of Biochemistry, (2000) 267 (12)
3432-3441, 51 ref.
ISSN: 0014-2956

DOCUMENT TYPE: Journal
LANGUAGE: English

AB Cyclodextrin glycosyltransferase (**CGTase**;
cyclomaltodextrin glucanotransferase; EC 2.4.1.19) is
used for industrial production of cyclodextrins for applications including
encapsulation of food flavourings. Its application, however, is hampered
by limited cyclodextrin product specificity and the strong inhibitory
effect of cyclodextrins on **CGTase** activity. Recent structural
studies have identified Arg47 in **Bacillus circulans** strain 251
CGTase as an active-site residue interacting with cyclodextrins,
but not with linear oligosaccharides. Thus, Arg47 may specifically affect
CGTase reactions with cyclic substrates or products. Mutations of
Arg47 (to Leu or Gln) were shown to have a negative effect on cyclization
and coupling activities; Arg47 specifically stabilized the oligosaccharide
chain in the transition state for these reactions. As a result,
mutant proteins displayed a shift in product specificity towards
formation of larger cyclodextrins. As expected, both **mutants**
also showed lower affinities for cyclodextrins in the coupling reaction,
and reduced competitive (product) inhibition of the disproportionation
reaction by cyclodextrins. Both **mutants** provided valuable
information about processes taking place during cyclodextrin production
assays. **Mutant** Arg47Leu displayed increased hydrolysing
activity, causing accumulation of increasing amounts of short
oligosaccharides in the reaction mixture, which resulted in lower final
amounts of cyclodextrins produced from starch. Interestingly,
mutant Arg47Gln displayed an increased ratio of
cyclization/coupling reactions and decreased hydrolysing activity. Due to
the decreased coupling activity, which especially affected production of
larger cyclodextrins, this **CGTase variant** produced
various cyclodextrins in a stable ratio. It is suggested that this
feature is promising for industrial application of **CGTase**
enzymes with improved product specificity.

L6 ANSWER 3 OF 7 BIOTECHDS COPYRIGHT 2002 THOMSON DERWENT AND ISI
ACCESSION NUMBER: 1999-08460 BIOTECHDS

TITLE: **Cyclomaltodextrin-glucanotransferase**
variants of increased product specificity;
recombinant cyclomaltodextrin-
glucanotransferase variant used in the
production of cyclodextrin isoforms

AUTHOR: Andersen C; Nielsen B R; Dijkhuizen L; Dijkstra B
PATENT ASSIGNEE: Novo-Nordisk
LOCATION: Bagsvaerd, Denmark.
PATENT INFO: WO 9915633 1 Apr 1999
APPLICATION INFO: WO 1998-DK412 23 Sep 1998
PRIORITY INFO: US 1997-62659 8 Oct 1997; DK 1997-1098 24 Sep 1997
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: WPI: 1999-263478 [22]

AB **Cyclomaltodextrin-glucanotransferase** (EC-2.4.1.19,
CTGase) **variants** with an increased product specificity are
claimed. The CTGase **variants** have specific amino acid
alterations at one or more of positions 47, 145, 146, 147, 196
and 371. These **variants** are used in the production of alpha-
beta- or gamma-cyclodextrins (CD) which are used in food, chemicals,
cosmetics and pharmaceuticals. The CD form inclusion bodies with small
hydrophobic molecules resulting in increased solubility and stability,
and a reduced reactivity and volatility. The CTGase **variants**

have an increased specificity for specific CD isoforms which will decrease cost and environmental hazards associated with other procedures for CD separation. The CTGase **variants** were derived from **Bacillus** sp., **Brevibacterium** sp., **Clostridium** sp., **Corynebacterium** sp., **Klebsiella** sp., **Micrococcus** sp., **Thermoanaerobium** sp., **Thermoanaerobacterium** sp., **Thermoanaerobacter** sp., and **Thermoactinomyces** sp., especially **Bacillus** circulans 251 and **Thermoanaerobacter** sp. ATCC 53627, and were produced by **recombinant** expression in *Escherichia coli* PC1990 using plasmid pCT2. (40pp)

L6 ANSWER 4 OF 7 MEDLINE
 ACCESSION NUMBER: 1999241045 MEDLINE
 DOCUMENT NUMBER: 99241045 PubMed ID: 10222200
 TITLE: Crystal structure of Thermoactinomyces vulgaris R-47 alpha-amylase II (TVAIL) hydrolyzing cyclodextrins and pullulan at 2.6 A resolution.
 AUTHOR: Kamitori S; Kondo S; Okuyama K; Yokota T; Shimura Y; Tonozuka T; Sakano Y
 CORPORATE SOURCE: Department of Biotechnology and Life Science, Faculty of Technology, Tokyo University of Agriculture and Technology, Koganei, Tokyo, 184-8588, Japan.kamitori@cc.tuat.ac.jp
 SOURCE: JOURNAL OF MOLECULAR BIOLOGY, (1999 Apr 16) 287 (5) 907-21. Journal code: 2985088R. ISSN: 0022-2836.
 PUB. COUNTRY: ENGLAND: United Kingdom
 DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
 LANGUAGE: English
 FILE SEGMENT: Priority Journals
 OTHER SOURCE: PDB-1BVZ; PDB-1BVZSF
 ENTRY MONTH: 199905
 ENTRY DATE: Entered STN: 19990601
 Last Updated on STN: 19990601
 Entered Medline: 19990519

AB The crystal structure of Thermoactinomyces vulgaris R-47 alpha-Amylase II (TVAIL) has been determined by multiple isomorphous replacement at 2.6 A resolution. TVAIL was crystallized in an orthorhombic system with the space group P212121 and the cell dimensions a=118.5 A, b=119.5 A, c=114.5 A. There are two molecules in an asymmetric unit, related by the non-crystallographic 2-fold symmetry. Diffraction data were collected at 113 K and the cell dimensions reduced to a=114.6 A, b=117.9 A, c=114.2 A, and the model was refined against 7.0-2.6 A resolution data giving an R-factor of 0.204 (Rfree=0.272). The final model consists of 1170 amino acid residues (two molecules) and 478 water molecules with good chemical geometry. TVAIL has three domains, A, B, and C, like other alpha-amylases. Domain A with a (beta/alpha)₈ barrel structure and domain C with a beta-sandwich structure are very similar to those found in other alpha-amylases. Additionally, TVAIL has an extra domain N composed of 121 amino acid residues at the N-terminal site, which has a beta-barrel-like structure consisting of seven antiparallel beta-strands. Domain N is one of the driving forces in the formation of the dimer structure of TVAIL, but its role in the enzyme activity is still not clear. TVAIL does not have the Ca²⁺ binding site that connects domains A and B in other alpha-amylases, rather the NZ atom of Lys299 of TVAIL serves as the connector between these domains. TVAIL can hydrolyze cyclodextrins and pullulan as well as starch. Based on a structural comparison with the complex between a **mutant** cyclodextrin glucanotransferase and a beta-cyclodextrin derivative, Phe286 located at domain B is considered the residue most likely to recognize the hydrophobic cavity of cyclodextrins. The active-site cleft of TVAIL is wider and shallower than that of other alpha-amylases, and seems to be suitable for the binding of pullulan which is expected not to adopt the helical structure of amylose.
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L6 ANSWER 5 OF 7 BIOTECHDS COPYRIGHT 2002 THOMSON DERWENT AND ISI

ACCESSION NUMBER: 1997-06731 BIOTECHDS
TITLE: Production of cyclodextrin using raw corn starch without a pretreatment;
and thermostable enzyme, **cyclomaltodextrin-glucanotransferase**

AUTHOR: Kim T J; Kim B C; Lee H S

CORPORATE SOURCE: Samyang-Genex

LOCATION: Food Application Laboratory, Sam Yang Genex Research Institute, 63-2, Hwaam-dong, Yusung-gu, Taejeon, 305-48, South Korea.

SOURCE: Enzyme Microb.Technol.; (1997) 20, 7, 506-09

CODEN: EMTED2

ISSN: 0141-0229

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A much improved cyclodextrin-producing method was investigated. Thermostable **cyclomaltodextrin-glucanotransferase** (**CGTase**, EC-2.4.1.19), obtained from a Thermoanaerobacter sp., was expressed in and produced by a selected strain of **Bacillus** sp. The optimum temp. was 90 deg, and pH was 5.0-6.5. Corn starch was incubated with the enzyme without any pretreatment. This method meant that there was no degradation of the cyclodextrins produced, the enzyme was used efficiently and the residual substrate was removed by a physical method. The residual substrate could be used for other products. The conditions for the production of cyclodextrins were: substrate, corn starch; optimum reaction temp. of 65 deg; substrate concentration was 7.5%; and enzyme concentration, 22 U/g starch. The conversion of substrate to cyclodextrin and maltodextrin was 27.9 and 31.4%, respectively, with 40.7% substrate remaining. After the removal of residual starch, the final product contained 47% of cyclodextrin. (9 ref)

L6 ANSWER 6 OF 7 BIOTECHDS COPYRIGHT 2002 THOMSON DERWENT AND ISI

ACCESSION NUMBER: 1993-03698 BIOTECHDS

TITLE: Development of a **Bacillus brevis** host-vector system for efficient heterologous protein production and its application to protein engineering;
amylase, **cyclomaltodextrin-glucanotransferase**, pepsinogen and epidermal growth factor gene cloning in protease-deficient host using plasmid pNU200 and plasmid pHY700 (conference paper)

AUTHOR: Yamagata H

LOCATION: Department of Food Science and Technology, Faculty of Agriculture, Nagoya University, Chikusa-ku, Nagoya 464, Japan.

SOURCE: Biochem.Eng.2001; (1992) 21-26

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A host-vector system using **Bacillus brevis** was developed. The strain had very low extracellular protease activity, and produced extracellular proteins in large amounts, making it a promising host for heterologous protein production. **B. brevis** 47 and HPD31 were used as hosts, and plasmid pNU200 and plasmid pHY700 were used as vectors. Many bacterial proteins, e.g. thermostable alpha-amylase (EC-3.2.1.1) from **Bacillus licheniformis** or **Bacillus stearothermophilus**, **cyclomaltodextrin-glucanotransferase** (EC-2.4.1.19) from **Bacillus macerans** and beta-amylase (EC-3.2.1.2) from *Clostridium thermosulfurogenes* were produced at 1.0-3.5 g/l culture using this system. Eukaryotic proteins (e.g. Taka-amylase-A, pepsinogen and salivary amylase) were produced at lower levels (more than 10-fold smaller, except for human epidermal growth factor which was produced at 1.1 g/l), but levels were still higher than those using other bacterial systems. A mutant (**B. brevis** 47K) producing increased amounts of human recombinant

salivary alpha-amylase was isolated. (17 ref)

=> d 13 ibib ab

L3 ANSWER 1 OF 1 BIOTECHDS COPYRIGHT 2002 THOMSON DERWENT AND ISI

ACCESSION NUMBER: 1993-03698 BIOTECHDS

TITLE: Development of a *Bacillus brevis* host-vector system for efficient heterologous protein production and its application to protein engineering;
amylase, **cyclomaltodextrin-glucanotransferase**, pepsinogen and epidermal growth factor gene cloning in protease-deficient host using plasmid pNU200 and plasmid pHY700 (conference paper)

AUTHOR: Yamagata H

LOCATION: Department of Food Science and Technology, Faculty of Agriculture, Nagoya University, Chikusa-ku, Nagoya 464, Japan.

SOURCE: Biochem.Eng.2001; (1992) 21-26

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A host-vector system using *Bacillus brevis* was developed. The strain had very low extracellular protease activity, and produced extracellular proteins in large amounts, making it a promising host for heterologous protein production. *B. brevis* 47 and HPD31 were used as hosts, and plasmid pNU200 and plasmid pHY700 were used as vectors. Many bacterial proteins, e.g. thermostable alpha-amylase (EC-3.2.1.1) from *Bacillus licheniformis* or *Bacillus stearothermophilus*, **cyclomaltodextrin-glucanotransferase** (EC-2.4.1.19) from *Bacillus macerans* and beta-amylase (EC-3.2.1.2) from *Clostridium thermosulfurogenes* were produced at 1.0-3.5 g/l culture using this system. Eukaryotic proteins (e.g. Taka-amylase-A, pepsinogen and salivary amylase) were produced at lower levels (more than 10-fold smaller, except for human epidermal growth factor which was produced at 1.1 g/l), but levels were still higher than those using other bacterial systems. A **mutant** (*B. brevis* 47K) producing increased amounts of human **recombinant** salivary alpha-amylase was isolated. (17 ref)

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L4: Entry 1 of 2

File: PGPB

Apr 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020042120

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020042120 A1

TITLE: Novel cyclomalto-dextrin glucanotransferase variants

PUBLICATION-DATE: April 11, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Andersen, Carsten	Vaerlose		DK	
Nielsen, Bjarne Ronfeldt	Virum		DK	
Dijkhuizen, Lubbert	Haren		NL	
Dijkstra, Bauke	Haren		NL	

US-CL-CURRENT: 435/221; 435/252.3, 435/320.1, 536/23.2

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Draw Desc	Image
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☐ 2. Document ID: US 6271010 B1

L4: Entry 2 of 2

File: USPT

Aug 7, 2001

US-PAT-NO: 6271010

DOCUMENT-IDENTIFIER: US 6271010 B1

TITLE: Cyclomalto-dextrin glucanotransferase variants

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Draw Desc	Image
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<u>L3</u>	L2 same (47C, 47D, 47E, 47F, 47G, 47I, 47K, 47N, 47P, 47R, 47S, 47T, 47V, 47W, 47Y)	0	<u>L3</u>
<u>L2</u>	L1 same (mutant or variant)	27	<u>L2</u>
<u>L1</u>	CGTase	249	<u>L1</u>

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<u>L6</u>	L5 and (47cys, 47asp, 47glu, 47phe, 47gly, 47ile, 47lys, 47asn, 47pro, 47arg, 47ser, 47thr, 47val, 47trp, 47tyr)	0	<u>L6</u>
<u>L5</u>	L1 same bacillus	114	<u>L5</u>
<u>L4</u>	L2 and (47C, 47D, 47E, 47F, 47G, 47I, 47K, 47N, 47P, 47R, 47S, 47T, 47V, 47W, 47Y)	2	<u>L4</u>
<u>L3</u>	L2 same (47C, 47D, 47E, 47F, 47G, 47I, 47K, 47N, 47P, 47R, 47S, 47T, 47V, 47W, 47Y)	0	<u>L3</u>
<u>L2</u>	L1 same (mutant or variant)	27	<u>L2</u>
<u>L1</u>	CGTase	249	<u>L1</u>

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L7: Entry 4 of 6

File: DWPI

Jan 27, 1995

DERWENT-ACC-NO: 1995-100943

DERWENT-WEEK: 199514

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TITLE: Modified cyclo-malto-dextrin glucano-transferase and corresp. gene - useful in the prodn. of gamma-dextrin

PATENT-ASSIGNEE:

ASSIGNEE

OJI CORN STARCH CO LTD

CODE

OJIP

PRIORITY-DATA: 1993JP-0155117 (June 25, 1993)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 07023781 A	January 27, 1995		010	C12N009/10

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 07023781A	June 25, 1993	1993JP-0155117	

INT-CL (IPC): C12 N 9/10; C12 N 15/54; C12 P 19/18; C12 N 9/10; C12 R 1:19; C12 N 15/54; C12 R 1:07

ABSTRACTED-PUB-NO: JP 07023781A

BASIC-ABSTRACT:

A cyclomaltodextrin glucanotransferase (CGTase) in which tyrosine or phenylalanine at position 56 (when histidine of A region is defined to be first position) is replaced by leucine or valine is new. Also claimed are (1) a method for the prepn. of the above modified CGTase in which a host transformed by an expression vector contg. a DNA encoding the modified CGTase is cultured and the modified CGTase is collected from the culture, (2) a gene coding the above modified CGTase, and (3) a method for the prepn. of gamma-cyclodextrin in which the above modified CGTase is reacted with starch and gamma-dextrin is sepd. from the reaction liquid.

ADVANTAGE - The method can form gamma-dextrin at a ratio of 70% based on the total cyclodextrin.

CHOSEN-DRAWING: Dwg.0/1

TITLE-TERMS: MODIFIED CYCLO MALTO DEXTRIN TRANSFERASE CORRESPOND GENE USEFUL PRODUCE GAMMA DEXTRIN

DERWENT-CLASS: B04 D21

CPI-CODES: B04-C02B1; B04-E01; B04-L04; D05-C03D; D05-C08; D05-H12B; D05-H17B3;

CHEMICAL-CODES:

Chemical Indexing M1 *01*

Fragmentation Code

M423 M710 M720 M903 V500 V540 V753 V802 V812

Chemical Indexing M1 *02*

Fragmentation Code

M423 M720 M903 M904 M910 N131 N134 N135 Q233 V0
V722

Specific Compounds

04818P

Registry Numbers

1856P

UNLINKED-DERWENT-REGISTRY-NUMBERS: 1856P

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1995-045772